



SEQUENCE LISTING

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Tolan Dr., Jeffrey S.

<120> Thermostable Xylanases

<130> 08881610US1

<140> 09/856,025

<141> 2001-09-13

<150> 60/108,504

<151> 1998-11-16

<160> 65

<170> PatentIn Ver. 2.1

<210> 1

<211> 184

<212> PRT

<213> Aspergillus niger

<400> 1

Ser Ala Gly Ile Asn Tyr Val Gln Asn Tyr Asn Gly Asn Leu Gly Asp
1 5 10 15

Phe Thr Tyr Asp Glu Ser Ala Gly Thr Phe Ser Met Tyr Trp Glu Asp
20 25 30

Gly Val Ser Ser Asp Phe Val Val Gly Leu Gly Trp Thr Thr Gly Ser
35 40 45

Ser Asn Ala Ile Thr Tyr Ser Ala Glu Tyr Ser Ala Ser Gly Ser Ser
50 55 60

Ser Tyr Leu Ala Val Tyr Gly Trp Val Asn Tyr Pro Gly Ala Glu Tyr
65 70 75 80

Tyr Ile Val Glu Asp Tyr Gly Asp Tyr Asn Pro Cys Ser Ser Ala Thr
85 90 95

Ser Leu Gly Thr Val Tyr Ser Asp Gly Ser Thr Tyr Gln Val Cys Thr
100 105 110

Asp Thr Arg Ile Asn Glu Pro Ser Ile Thr Gly Thr Ser Thr Phe Thr
115 120 125

Gln Tyr Phe Ser Val Arg Glu Ser Thr Arg Thr Ser Gly Thr Val Thr
130 135 140

Val Ala Asn His Phe Asn Phe Trp Ala Gln His Gly Phe Gly Asn Ser
145 150 155 160

Asp Phe Asn Tyr Gln Val Met Ala Val Glu Ala Trp Ser Gly Ala Gly
165 170 175

Ser Ala Ser Val Thr Ile Ser Ser
180

<210> 2

<211> 185

<212> PRT

<213> *Aspergillus tubingensis*

<400> 2

Ser Ala Gly Ile Asn Tyr Val Gln Asn Tyr Asn Gln Asn Leu Gly Asp
1 5 10 15

Phe Thr Tyr Asp Glu Ser Ala Gly Thr Phe Ser Met Tyr Trp Glu Asp
20 25 30

Gly Val Ser Ser Asp Phe Val Val Gly Leu Gly Gly Trp Thr Thr Gly
35 40 45

Ser Ser Asn Ala Ile Thr Tyr Ser Ala Glu Tyr Ser Ala Ser Gly Ser
50 55 60

Ala Ser Tyr Leu Ala Val Tyr Gly Trp Val Asn Tyr Pro Gln Ala Glu
65 70 75 80

Tyr Tyr Ile Val Glu Asp Tyr Gly Asp Tyr Asn Pro Cys Ser Ser Ala
85 90 95

Thr Ser Leu Gly Thr Val Tyr Ser Asp Gly Ser Thr Tyr Gln Val Cys
100 105 110

Thr Asp Thr Arg Ile Asn Glu Pro Ser Ile Thr Gly Thr Ser Thr Phe
115 120 125

Thr Gln Tyr Phe Ser Val Arg Glu Ser Thr Arg Thr Ser Gly Thr Val
130 135 140

Thr Val Ala Asn His Phe Asn Phe Trp Ala His His Gly Phe His Asn
145 150 155 160

Ser Asp Phe Asn Tyr Gln Val Val Ala Val Glu Ala Trp Ser Gly Ala
165 170 175

Gly Ser Ala Ala Val Thr Ile Ser Ser
180 185

<210> 3

<211> 185

<212> PRT

<213> *Bacillus circulans*

<400> 3

Ala Ser Thr Asp Tyr Trp Gln Asn Trp Thr Asp Gly Gly Gly Ile Val
1 5 10 15

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			20					25					30			
Thr	Gly	Asn	Phe	Val	Val	Gly	Lys	Gly	Trp	Thr	Thr	Gly	Ser	Pro	Phe	
		35					40					45				
Arg	Thr	Ile	Asn	Tyr	Asn	Ala	Gly	Val	Trp	Ala	Pro	Asn	Gly	Asn	Gly	
	50					55					60					
Tyr	Leu	Thr	Leu	Tyr	Gly	Trp	Thr	Arg	Ser	Pro	Leu	Ile	Glu	Tyr	Tyr	
	65				70					75					80	
Val	Val	Asp	Ser	Trp	Gly	Thr	Tyr	Arg	Pro	Thr	Gly	Thr	Tyr	Lys	Gly	
				85					90					95		
Thr	Val	Lys	Ser	Asp	Gly	Gly	Thr	Tyr	Asp	Ile	Tyr	Thr	Thr	Thr	Arg	
			100					105					110			
Tyr	Asn	Ala	Pro	Ser	Ile	Asp	Gly	Asp	Arg	Thr	Thr	Phe	Thr	Gln	Tyr	
	115						120					125				
Trp	Ser	Val	Arg	Gln	Ser	Lys	Arg	Pro	Thr	Gly	Ser	Asn	Ala	Thr	Ile	
	130					135						140				
Thr	Phe	Thr	Asn	His	Val	Asn	Ala	Trp	Lys	Ser	His	Gly	Met	Asn	Leu	
	145				150					155					160	
Gly	Ser	Asn	Trp	Ala	Tyr	Gln	Val	Met	Ala	Thr	Glu	Gly	Tyr	Gln	Ser	
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Ser	Gly	Ser	Ser	Asn	Val	Thr	Val	Trp								
			180					185								

<210> 4
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 <212> PRT
 <213> Bacillus pumilus

<400> 4																
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			20					25					30			
Gly	Ala	Phe	Ser	Ala	Gly	Trp	Asn	Asn	Ile	Gly	Asn	Ala	Leu	Phe	Arg	
		35					40					45				
Lys	Gly	Lys	Lys	Phe	Asp	Ser	Thr	Arg	Thr	His	His	Gln	Leu	Gly	Asn	
	50					55					60					
Ile	Ser	Ile	Asn	Tyr	Asn	Ala	Ser	Phe	Asn	Pro	Ser	Gly	Asn	Ser	Tyr	
	65				70					75					80	
Leu	Cys	Val	Tyr	Gly	Trp	Thr	Gln	Ser	Pro	Leu	Ala	Glu	Tyr	Tyr	Ile	
				85					90					95		

Val Asp Ser Trp Gly Thr Tyr Arg Pro Thr Gly Ala Tyr Lys Gly Ser
 100 105 110
 Phe Tyr Ala Asp Gly Gly Thr Tyr Asp Ile Tyr Glu Thr Thr Arg Val
 115 120 125
 Asn Gln Pro Ser Ile Ile Gly Ile Ala Thr Phe Lys Gln Tyr Trp Ser
 130 135 140
 Val Arg Gln Thr Lys Arg Thr Ser Gly Thr Val Ser Val Ser Ala His
 145 150 155 160
 Phe Arg Lys Trp Glu Ser Leu Gly Met Pro Met Gly Lys Met Tyr Glu
 165 170 175
 Thr Ala Phe Thr Val Glu Gly Tyr Gln Ser Ser Gly Ser Ala Asn Val
 180 185 190
 Met Thr Asn Gln Leu Phe Ile Gly Asn
 195 200

<210> 5
 <211> 185
 <212> PRT
 <213> Bacillus subtilis

<400> 5
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 Asn Ala Val Asn Gly Ser Gly Gly Asn Tyr Ser Val Asn Trp Ser Asn
 20 25 30
 Thr Gly Asn Phe Val Val Gly Lys Gly Trp Thr Thr Gly Ser Pro Phe
 35 40 45
 Arg Thr Ile Asn Tyr Asn Ala Gly Val Trp Ala Pro Asn Gly Asn Gly
 50 55 60
 Tyr Leu Thr Leu Tyr Gly Trp Thr Arg Ser Pro Leu Ile Glu Tyr Tyr
 65 70 75 80
 Val Val Asp Ser Trp Gly Thr Tyr Arg Pro Thr Gly Thr Tyr Lys Gly
 85 90 95
 Thr Val Lys Ser Asp Gly Gly Thr Tyr Asp Ile Tyr Thr Thr Thr Arg
 100 105 110
 Tyr Asn Ala Pro Ser Ile Asp Gly Asp Arg Thr Thr Phe Thr Gln Tyr
 115 120 125
 Trp Ser Val Arg Gln Ser Lys Arg Pro Thr Gly Ser Asn Ala Thr Ile
 130 135 140

Thr Phe Ser Asn His Val Asn Ala Trp Lys Ser His Gly Met Asn Leu
 145 150 155 160

Gly Ser Asn Trp Ala Tyr Gln Val Met Ala Thr Glu Gly Tyr Gln Ser
 165 170 175

Ser Gly Ser Ser Asn Val Thr Val Trp
 180 185

<210> 6

<211> 211

<212> PRT

<213> Clostridium acetobutylicum

<400> 6

Ser Ala Phe Asn Thr Gln Ala Ala Pro Lys Thr Ile Thr Ser Asn Glu
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Ile Gly Val Asn Gly Gly Tyr Asp Tyr Glu Leu Trp Lys Asp Tyr Gly
 20 25 30

Asn Thr Ser Met Thr Leu Lys Asn Gly Gly Ala Phe Ser Cys Gln Trp
 35 40 45

Ser Asn Ile Gly Asn Ala Leu Phe Arg Lys Gly Lys Lys Phe Asn Asp
 50 55 60

Thr Gln Thr Tyr Lys Gln Leu Gly Asn Ile Ser Val Asn Tyr Asn Cys
 65 70 75 80

Asn Tyr Gln Pro Tyr Gly Asn Ser Tyr Leu Cys Val Tyr Gly Trp Thr
 85 90 95

Ser Ser Pro Leu Val Glu Tyr Tyr Ile Val Asp Ser Trp Gly Ser Trp
 100 105 110

Arg Pro Pro Gly Gly Thr Ser Lys Gly Thr Ile Thr Val Asp Gly Gly
 115 120 125

Ile Tyr Asp Ile Tyr Glu Thr Thr Arg Ile Asn Gln Pro Ser Ile Gln
 130 135 140

Gly Asn Thr Thr Phe Lys Gln Tyr Trp Ser Val Arg Arg Thr Lys Arg
 145 150 155 160

Thr Ser Gly Thr Ile Ser Val Ser Lys His Phe Ala Ala Trp Glu Ser
 165 170 175

Lys Gly Met Pro Leu Gly Lys Met His Glu Thr Ala Phe Asn Ile Glu
 180 185 190

Gly Tyr Gln Ser Ser Gly Lys Ala Asp Val Asn Ser Met Ser Ile Asn
 195 200 205

Ile Gly Lys
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<210> 7
 <211> 206
 <212> PRT
 <213> Clostridium stercorarium

<400> 7
 Gly Arg Ile Ile Tyr Asp Asn Glu Thr Gly Thr His Gly Gly Tyr Asp
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 Tyr Glu Leu Trp Lys Asp Tyr Gly Asn Thr Ile Met Glu Leu Asn Asp
 20 25 30
 Gly Gly Thr Phe Ser Cys Gln Trp Ser Asn Ile Gly Asn Ala Leu Phe
 35 40 45
 Arg Lys Gly Arg Lys Phe Asn Ser Asp Lys Thr Tyr Gln Glu Leu Gly
 50 55 60
 Asp Ile Val Val Glu Tyr Gly Cys Asp Tyr Asn Pro Asn Gly Asn Ser
 65 70 75 80
 Tyr Leu Cys Val Tyr Gly Trp Thr Arg Asn Phe Leu Val Glu Tyr Tyr
 85 90 95
 Ile Val Glu Ser Trp Gly Ser Trp Arg Pro Pro Gly Ala Thr Pro Lys
 100 105 110
 Gly Thr Ile Thr Gln Trp Met Ala Gly Thr Tyr Glu Ile Tyr Glu Thr
 115 120 125
 Thr Arg Val Asn Gln Pro Ser Ile Asp Gly Thr Ala Thr Phe Gln Gln
 130 135 140
 Tyr Trp Ser Val Arg Thr Ser Lys Arg Thr Ser Gly Thr Ile Ser Val
 145 150 155 160
 Thr Glu His Phe Lys Gln Trp Glu Arg Met Gly Met Arg Met Gly Lys
 165 170 175
 Met Tyr Glu Val Ala Leu Thr Val Glu Gly Tyr Gln Ser Ser Gly Tyr
 180 185 190
 Ala Asn Val Tyr Lys Asn Glu Ile Arg Ile Gly Ala Asn Pro
 195 200 205

<210> 8
 <211> 211
 <212> PRT
 <213> Ruminococcus flavefaciens

<400> 8
 Ser Ala Ala Asp Gln Gln Thr Arg Gly Asn Val Gly Gly Tyr Asp Tyr
 1 5 10 15

Glu Met Trp Asn Gln Asn Gly Gln Gly Gln Ala Ser Met Asn Pro Gly
 20 25 30
 Ala Gly Ser Phe Thr Cys Ser Trp Ser Asn Ile Glu Asn Phe Leu Ala
 35 40 45
 Arg Met Gly Lys Asn Tyr Asp Ser Gln Lys Lys Asn Tyr Lys Ala Phe
 50 55 60
 Gly Asn Ile Val Leu Thr Tyr Asp Val Glu Tyr Thr Pro Arg Gly Asn
 65 70 75 80
 Ser Tyr Met Cys Val Tyr Gly Trp Thr Arg Asn Pro Leu Met Glu Tyr
 85 90 95
 Tyr Ile Val Glu Gly Trp Gly Asp Trp Arg Pro Pro Gly Asn Asp Gly
 100 105 110
 Glu Val Lys Gly Thr Val Ser Ala Asn Gly Asn Thr Tyr Asp Ile Arg
 115 120 125
 Lys Thr Met Arg Tyr Asn Gln Pro Ser Leu Asp Gly Thr Ala Thr Phe
 130 135 140
 Pro Gln Tyr Trp Ser Val Arg Gln Thr Ser Gly Ser Ala Asn Asn Gln
 145 150 155 160
 Thr Asn Tyr Met Lys Gly Thr Ile Asp Val Ser Lys His Phe Asp Ala
 165 170 175
 Trp Ser Ala Ala Gly Leu Asp Met Ser Gly Thr Leu Tyr Glu Val Ser
 180 185 190
 Leu Asn Ile Glu Gly Tyr Arg Ser Asn Gly Ser Ala Asn Val Lys Ser
 195 200 205
 Val Ser Val
 210

<210> 9
 <211> 197
 <212> PRT
 <213> Schizophyllum commune

<400> 9
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 Trp Trp Thr Asp Gly Ala Gly Asp Ala Thr Tyr Gln Asn Asn Gly Gly
 20 25 30
 Gly Ser Tyr Thr Leu Thr Trp Ser Gly Asn Asn Gly Asn Leu Val Gly
 35 40 45
 Gly Lys Gly Trp Asn Pro Gly Ala Ala Ser Arg Ser Ile Ser Tyr Ser
 50 55 60

Gly Thr Tyr Gln Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp
 65 70 75 80
 Thr Arg Ser Ser Leu Ile Glu Tyr Tyr Ile Val Glu Ser Tyr Gly Ser
 85 90 95
 Tyr Asp Pro Ser Ser Ala Ala Ser His Lys Gly Ser Val Thr Cys Asn
 100 105 110
 Gly Ala Thr Tyr Asp Ile Leu Ser Thr Trp Arg Tyr Asn Ala Pro Ser
 115 120 125
 Ile Asp Gly Thr Gln Thr Phe Glu Gln Phe Trp Ser Val Arg Asn Pro
 130 135 140
 Lys Lys Ala Pro Gly Gly Ser Ile Ser Gly Thr Val Asp Val Gln Cys
 145 150 155 160
 His Phe Asp Ala Trp Lys Gly Leu Gly Met Asn Leu Gly Ser Glu His
 165 170 175
 Asn Tyr Gln Ile Val Ala Thr Glu Gly Tyr Gln Ser Ser Gly Thr Ala
 180 185 190
 Thr Ile Thr Val Thr
 195

<210> 10
 <211> 191
 <212> PRT
 <213> Streptomyces lividans

<400> 10
 Asp Thr Val Val Thr Thr Asn Gln Glu Gly Thr Asn Asn Gly Tyr Tyr
 1 5 10 15
 Tyr Ser Phe Trp Thr Asp Ser Gln Gly Thr Val Ser Met Asn Met Gly
 20 25 30
 Ser Gly Gly Gln Tyr Ser Thr Ser Trp Arg Asn Thr Gly Asn Phe Val
 35 40 45
 Ala Gly Lys Gly Trp Ala Asn Gly Gly Arg Arg Thr Val Gln Tyr Ser
 50 55 60
 Gly Ser Phe Asn Pro Ser Gly Asn Ala Tyr Leu Ala Leu Tyr Gly Trp
 65 70 75 80
 Thr Ser Asn Pro Leu Val Glu Tyr Tyr Ile Val Asp Asn Trp Gly Thr
 85 90 95
 Tyr Arg Pro Thr Gly Glu Tyr Lys Gly Thr Val Thr Ser Asp Gly Gly
 100 105 110

Thr	Tyr	Asp	Ile	Tyr	Lys	Thr	Thr	Arg	Val	Asn	Lys	Pro	Ser	Val	Glu
		115						120							125
Gly	Thr	Arg	Thr	Phe	Asp	Gln	Tyr	Trp	Ser	Val	Arg	Gln	Ser	Lys	Arg
	130					135					140				
Thr	Gly	Gly	Thr	Ile	Thr	Thr	Gly	Asn	His	Phe	Asp	Ala	Trp	Ala	Arg
145					150					155					160
Ala	Gly	Met	Pro	Leu	Gly	Asn	Phe	Ser	Tyr	Tyr	Met	Ile	Asn	Ala	Thr
				165					170					175	
Glu	Gly	Tyr	Gln	Ser	Ser	Gly	Thr	Ser	Ser	Ile	Asn	Val	Gly	Gly	
			180					185					190		

<210> 11
 <211> 191
 <212> PRT
 <213> Streptomyces lividans

<400> 11															
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1				5					10					15	
Ser	Phe	Trp	Thr	Asp	Gly	Gly	Gly	Ser	Val	Ser	Met	Thr	Leu	Asn	Gly
			20					25					30		
Gly	Gly	Ser	Tyr	Ser	Thr	Gln	Trp	Thr	Asn	Cys	Gly	Asn	Phe	Val	Ala
		35					40					45			
Gly	Lys	Gly	Trp	Ser	Thr	Gly	Asp	Gly	Asn	Val	Arg	Tyr	Asn	Gly	Tyr
	50					55					60				
Phe	Asn	Pro	Val	Gly	Asn	Gly	Tyr	Gly	Cys	Leu	Tyr	Gly	Trp	Thr	Ser
65					70					75					80
Asn	Pro	Leu	Val	Glu	Tyr	Tyr	Ile	Val	Asp	Asn	Trp	Gly	Ser	Tyr	Arg
				85					90					95	
Pro	Thr	Gly	Thr	Tyr	Lys	Gly	Thr	Val	Ser	Ser	Asp	Gly	Gly	Thr	Tyr
			100					105					110		
Asp	Ile	Tyr	Gln	Thr	Thr	Arg	Tyr	Asn	Ala	Pro	Ser	Val	Glu	Gly	Thr
		115					120					125			
Lys	Thr	Phe	Gln	Gln	Tyr	Trp	Ser	Val	Arg	Gln	Ser	Lys	Val	Thr	Ser
	130					135					140				
Gly	Ser	Gly	Thr	Ile	Thr	Thr	Gly	Asn	His	Phe	Asp	Ala	Trp	Ala	Arg
145					150					155					160
Ala	Gly	Met	Asn	Met	Gly	Gln	Phe	Arg	Tyr	Tyr	Met	Ile	Asn	Ala	Thr
				165					170					175	
Glu	Gly	Tyr	Gln	Ser	Ser	Gly	Ser	Ser	Asn	Ile	Thr	Val	Ser	Gly	
			180					185					190		

<210> 12
 <211> 189
 <212> PRT
 <213> Streptomyces sp.

<400> 12
 Ala Thr Thr Ile Thr Asn Glu Thr Gly Tyr Asp Gly Met Tyr Tyr Ser
 1 5 10 15
 Phe Trp Thr Asp Gly Gly Gly Ser Val Ser Met Thr Leu Asn Gly Gly
 20 25 30
 Gly Ser Tyr Ser Thr Arg Trp Thr Asn Cys Gly Asn Phe Val Ala Gly
 35 40 45
 Lys Gly Trp Ala Asn Gly Gly Arg Arg Thr Val Arg Tyr Thr Gly Trp
 50 55 60
 Phe Asn Pro Ser Gly Asn Gly Tyr Gly Cys Leu Tyr Gly Trp Thr Ser
 65 70 75 80
 Asn Pro Leu Val Glu Tyr Tyr Ile Val Asp Asn Trp Gly Ser Tyr Arg
 85 90 95
 Pro Thr Gly Glu Thr Arg Gly Thr Val His Ser Asp Gly Gly Thr Tyr
 100 105 110
 Asp Ile Tyr Lys Thr Thr Arg Tyr Asn Ala Pro Ser Val Glu Ala Pro
 115 120 125
 Ala Ala Phe Asp Gln Tyr Trp Ser Val Arg Gln Ser Lys Val Thr Ser
 130 135 140
 Gly Thr Ile Thr Thr Gly Asn His Phe Asp Ala Trp Ala Arg Ala Gly
 145 150 155 160
 Met Asn Met Gly Asn Phe Arg Tyr Tyr Met Ile Asn Ala Thr Glu Gly
 165 170 175
 Tyr Gln Ser Ser Gly Ser Ser Thr Ile Thr Val Ser Gly
 180 185

<210> 13
 <211> 189
 <212> PRT
 <213> Thermomonospora fusca

<400> 13
 Ala Val Thr Ser Asn Glu Thr Gly Tyr His Asp Gly Tyr Phe Tyr Ser
 1 5 10 15
 Phe Trp Thr Asp Ala Pro Gly Thr Val Ser Met Glu Leu Gly Pro Gly
 20 25 30

Gly Asn Tyr Ser Thr Ser Trp Arg Asn Thr Gly Asn Phe Val Ala Gly
 35 40 45
 Lys Gly Trp Ala Thr Gly Gly Arg Arg Thr Val Thr Tyr Ser Ala Ser
 50 55 60
 Phe Asn Pro Ser Gly Asn Ala Tyr Leu Thr Leu Tyr Gly Trp Thr Arg
 65 70 75 80
 Asn Pro Leu Val Glu Tyr Tyr Ile Val Glu Ser Trp Gly Thr Tyr Arg
 85 90 95
 Pro Thr Gly Thr Tyr Met Gly Thr Val Thr Thr Asp Gly Gly Thr Tyr
 100 105 110
 Asp Ile Tyr Lys Thr Thr Arg Tyr Asn Ala Pro Ser Ile Glu Gly Thr
 115 120 125
 Arg Thr Phe Asp Gln Tyr Trp Ser Val Arg Gln Ser Lys Arg Thr Ser
 130 135 140
 Gly Thr Ile Thr Ala Gly Asn His Phe Asp Ala Trp Ala Arg His Gly
 145 150 155 160
 Met His Leu Gly Thr His Asp Tyr Met Ile Met Ala Thr Glu Gly Tyr
 165 170 175
 Gln Ser Ser Gly Ser Ser Asn Val Thr Leu Gly Thr Ser
 180 185

<210> 14

<211> 190

<212> PRT

<213> Trichoderma harzianum

<400> 14

Gln Thr Ile Gly Pro Gly Thr Gly Tyr Ser Asn Gly Tyr Tyr Tyr Ser
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 20 25 30
 Gly Ser Phe Thr Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly
 35 40 45
 Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly
 50 55 60
 Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Ile Tyr Gly Trp Ser
 65 70 75 80
 Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr
 85 90 95
 Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Val Thr Ser Asp Gly
 100 105 110

Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile
 115 120 125
 Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His
 130 135 140
 Arg Ser Ser Gly Ser Val Asn Thr Ala Asn His Phe Asn Ala Trp Ala
 145 150 155 160
 Ser His Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val
 165 170 175
 Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser
 180 185 190

<210> 15
 <211> 178
 <212> PRT
 <213> Trichoderma reesei

<400> 15
 Ala Ser Ile Asn Tyr Asp Gln Asn Tyr Gln Thr Gly Gly Gln Val Ser
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 Tyr Ser Pro Ser Asn Thr Gly Phe Ser Val Asn Trp Asn Thr Gln Asp
 20 25 30
 Asp Phe Val Val Gly Val Gly Trp Thr Thr Gly Ser Ser Ala Pro Ile
 35 40 45
 Asn Phe Gly Gly Ser Phe Ser Val Asn Ser Gly Thr Gly Leu Leu Ser
 50 55 60
 Val Tyr Gly Trp Ser Thr Asn Pro Leu Val Glu Tyr Tyr Ile Met Glu
 65 70 75 80
 Asp Asn His Asn Tyr Pro Ala Gln Gly Thr Val Lys Gly Thr Val Thr
 85 90 95
 Ser Asp Gly Ala Thr Tyr Thr Ile Trp Glu Asn Thr Arg Val Asn Glu
 100 105 110
 Pro Ser Ile Gln Gly Thr Ala Thr Phe Asn Gln Tyr Ile Ser Val Arg
 115 120 125
 Asn Ser Pro Arg Thr Ser Gly Thr Val Thr Val Gln Asn His Phe Asn
 130 135 140
 Trp Ala Ser Leu Gly Leu His Leu Gly Gln Met Met Asn Tyr Gln Val
 145 150 155 160
 Val Ala Val Glu Gly Trp Gly Gly Ser Gly Ser Ala Ser Gln Ser Val
 165 170 175
 Ser Asn

<210> 16
<211> 190

<212> PRT
<213> Trichoderma reesei

<400> 16

Gln	Thr	Ile	Gln	Pro	Gly	Thr	Gly	Tyr	Asn	Asn	Gly	Tyr	Phe	Tyr	Ser	
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Tyr	Trp	Asn	Asp	Gly	His	Gly	Gly	Val	Thr	Tyr	Thr	Asn	Gly	Pro	Gly	
			20					25					30			
Gly	Gln	Phe	Ser	Val	Asn	Trp	Ser	Asn	Ser	Gly	Asn	Phe	Val	Gly	Gly	
		35					40					45				
Lys	Gly	Trp	Gln	Pro	Gly	Thr	Lys	Asn	Lys	Val	Ile	Asn	Phe	Ser	Gly	
	50					55					60					
Ser	Tyr	Asn	Pro	Asn	Gly	Asn	Ser	Tyr	Leu	Ser	Val	Tyr	Gly	Trp	Ser	
	65				70					75					80	
Arg	Asn	Pro	Leu	Ile	Glu	Tyr	Tyr	Ile	Val	Glu	Asn	Phe	Gly	Thr	Tyr	
				85					90					95		
Asn	Pro	Ser	Thr	Gly	Ala	Thr	Lys	Leu	Gly	Glu	Val	Thr	Ser	Asp	Gly	
			100					105						110		
Ser	Val	Tyr	Asp	Ile	Tyr	Arg	Thr	Gln	Arg	Val	Asn	Gln	Pro	Ser	Ile	
		115					120					125				
Ile	Gly	Thr	Ala	Thr	Phe	Tyr	Gln	Tyr	Trp	Ser	Val	Arg	Arg	Asn	His	
	130					135					140					
Arg	Ser	Ser	Gly	Ser	Val	Asn	Thr	Ala	Asn	His	Phe	Asn	Ala	Trp	Ala	
	145				150					155					160	
Gln	Gln	Gly	Leu	Thr	Leu	Gly	Thr	Met	Asp	Tyr	Gln	Ile	Val	Ala	Val	
			165					170						175		
Glu	Gly	Tyr	Phe	Ser	Ser	Gly	Ser	Ala	Ser	Ile	Thr	Val	Ser			
			180					185					190			

<210> 17
<211> 190
<212> PRT
<213> Trichoderma viride

<400> 17

Gln	Thr	Ile	Gln	Pro	Gly	Thr	Gly	Phe	Asn	Asn	Gly	Tyr	Phe	Tyr	Ser	
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Tyr	Trp	Asn	Asp	Gly	His	Gly	Gly	Val	Thr	Tyr	Thr	Asn	Gly	Pro	Gly	
			20					25					30			

Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly
 35 40 45
 Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly
 50 55 60
 Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp Ser
 65 70 75 80
 Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr
 85 90 95
 Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Val Thr Ser Asp Gly
 100 105 110
 Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile
 115 120 125
 Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Thr His
 130 135 140
 Arg Ser Ser Gly Ser Val Asn Thr Ala Asn His Phe Asn Ala Trp Ala
 145 150 155 160
 Gln Gln Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val
 165 170 175
 Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser
 180 185 190

<210> 18

<211> 596

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:TrX synthetic sequence

<400> 18

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ccaatttagc gtcaattggg ctaactccgg aaacttcgta ggtggaaaag gttggcaacc 180
cgggaccaa aataagggtga tcaacttctc tggatcttat aatccgaatg ggaattcata 240
cttaagcgtc tatggctggg ctagaaccac actgattgaa tattacattg tcgaaaattt 300
cggtagctac aatccgagta ccggcgccac aaaattaggc gaagtcacta gtgatggatc 360
cgtatatgat atctaccgta cccaacgcgt taatcagcca tcgatcattg gaaccgccac 420
cttttatcag tactggagtg ttagacgtaa tcatcggagc tccggttcgg ttaatactgc 480
gaatcacttt aatgcatggg cacagcaagg gttaacccta ggtacaatgg attatcaaat 540
cgtagcggtg gaaggctact tctcgagtgg ttccgctagt attacagtga gctaaa 596
  
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<210> 19

<211> 40

<212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence:Trx-110C
 Synthetic Sequence

 <400> 19
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 <210> 20
 <211> 68
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence:Tx-110C-2

 <400> 20
 gcgccacaaa attaggcgaa gtcacttgtg atggatccgt atatgatatc taccgtagcc 60
 aacgcgtt 68

 <210> 21
 <211> 42
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence:Tx-103b

 <400> 21
 aatcagccat cgatcattgg aaccgccacc ttttatcagt ac 42

 <210> 22
 <211> 54
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence:XyTv-109
 Synthetic sequence

 <400> 22
 ggtggcgggt ccaatgatcg atggctgatt aacgcggttg gtacggtaga tatc 54

 <210> 23
 <211> 48
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence:Tx-108b

<400> 23
 cgaaccggag ctccgatgat tacgtctaac actccagtag tgataaaa 48

<210> 24
 <211> 52
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Tx-154C
 Synthetic sequence

<400> 24
 ctagggttaa cccttgatgat gccagggcat taaagtggca tgcagtatta ac 52

<210> 25
 <211> 84
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Tx-154C-2

<400> 25
 tggagtgtta gacgtaatca tcggagctcc ggttcgggta atactgcatg ccactttaat 60
 gcctgggcac agcaagggtt aacc 84

<210> 26
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Tx-162H-3

<400> 26
 ccacttcaat gcatgggcac agcacgggtt aacc 34

<210> 27
 <211> 42
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:TrX-162H-4

<400> 27
 ctagggttaa cccgtgctgt gcccatgcat tgaagtggca tg 42

<210> 28
 <211> 58

<212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence:XyTv-101

 <400> 28
 tcgacaattt cggtagctac aatccgagta ccggcgccac aaaattaggc gaagtcac 58

 <210> 29
 <211> 52
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence:XyTv-102

 <400> 29
 tagtgatgga tccgtatatg atatctaccg taccacaacgc gttaatcagc ca 52

 <210> 30
 <211> 60
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence:TrX-103

 <400> 30
 tcgatcattg gaaccgccac cttttatcag tactggagtg ttagacgtaa tcatcggagc 60

 <210> 31
 <211> 69
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence:XyTv-104

 <400> 31
 tccgggttcgg ttaatactgc gaatcacttt aatgcatggg cacagcaagg gttaacccta 60
 ggtacaatg 69

 <210> 32
 <211> 67
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence:XyTv-105

<400> 32
gattatcaaa tcgtagcggg ggaaggctac ttctcgagtg gttccgctag tattacagtg 60
agctaaa 67

<210> 33
<211> 53
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:XyTv-106
synthetic sequence

<400> 33
gatcttttagc tcaactgtaat actagcggaa ccactcgaga agtagccttc cac 53

<210> 34
<211> 66
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:XyTv-107

<400> 34
cgctacgatt tgataatcca ttgtacctag gggttaaccct tgctgtgccc atgcattaaa 60
gtgatt 66

<210> 35
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:TrX-108

<400> 35
cgcagtatta accgaaccgg agctccgatg attacgtcta acactccagt actgataaaa 60

<210> 36
<211> 73
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:XyTv-110

<400> 36
atatacggat ccatcactag tgacttcgcc taattttgtg ggcgcggtac tcggattgta 60
ggtaaccgaaa ttg 73

<210> 37
<211> 76
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:TrX-1

<400> 37
ctagctaagg aggctgcaga tgcaaacaat acaaccagga accgggttaca acaacggtta 60
cttttacagc tattgg 76

<210> 38
<211> 78
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:XyTv-2

<400> 38
aacgatggcc atgggtggtgt tacctataca aacggggcccg gaggccaatt tagcgtcaat 60
tgggtctaact ccggaaac 78

<210> 39
<211> 78
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:TrX-3

<400> 39
ttcgtaggtg gaaaagggtg gcaaccgagg accaaaaata aggtgatcaa cttctctgga 60
tcttataatc cgaatggg 78

<210> 40
<211> 74
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:XyTv-4

<400> 40
aattcatact taagcgtcta tggctggtct agaaaccac tgattgaata ttacattgtc 60
gaaaatttcg gtac 74

<210> 41
<211> 85
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:XyTv-5

<400> 41

gcaaatttttc gacaatgtaa tattcaatca gtgggtttct agaccagcca tagacgctta 60
agtatgaatt cccattcgga ttata 85

<210> 42

<211> 78

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Trx-6Synthetic
sequence

<400> 42

agatccagag aagttgatca ccttattttt ggtcccgggt tgccaacctt ttccacctac 60
gaagtttccg gagttaga 78

<210> 43

<211> 84

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:XyTv-7
Synthetic sequence

<400> 43

ccaattgacg ctaaattggc ctccggggccc gtttgtatag gtaacaccac catggccatc 60
gttccaatag ctgtaaaagt aacc 84

<210> 44

<211> 51

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:TrX-8 synthetic
sequence

<400> 44

gttggtgtaa ccggttcctg gttgtattgt ttgcatctgc agcctcctta g 51

<210> 45

<211> 40

<212> DNA

<213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Tx-108C
 synthetic sequence

<400> 45
 atatacggat ccatcactag tgcattcgcc taattttgtg 40

<210> 46
 <211> 68
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Tx-108C-2

<400> 46
 gcgccacaaa attaggcgaa tgcactagtg atggatccgt atatgatatc taccgtaccc 60
 aacgcggt 68

<210> 47
 <211> 52
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Tx-158C-162H
 synthetic sequence

<400> 47
 ctagggttaa cccgtgtgat gccagcaat taaagtgatt tgcagtatta ac 52

<210> 48
 <211> 84
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Tx-158C-162H-2

<400> 48
 tggagtgtta gacgtaatca tcggagctcc ggttcgggtta atactgcaaa tcactttaat 60
 tgctgggcac agcacgggtt aacc 84

<210> 49
 <211> 40
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:Tx-108C-110C
 synthetic sequence

<400> 49
atatacggat ccatcacaag tgcattcgcc taattttgtg 40

<210> 50
<211> 68
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Tx-108C-110C-2
synthetic sequence

<400> 50
gcgccacaaa attaggcgaa tgcacttggt atggatccgt atatgatatc taccgtaccc 60
aacgcggt 68

<210> 51
<211> 52
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial
Sequence:Tx-154C-158C-152H synthetic sequeunce

<400> 51
ctaggggttaa cccgtgtgat gccagcaat taaagtggca tgcagtatta ac 52

<210> 52
<211> 84
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial
Sequence:Tx-154C-158C-162H-2

<400> 52
tggagtgtta gacgtaatca tcggagctcc ggttcgggtta atactgcatg ccactttaat 60
tgctgggcac agcacgggtt aacc 84

<210> 53
<211> 190
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:TrX amino acid
sequence

<400> 53

Gln Thr Ile Gln Pro Gly Thr Gly Tyr Asn Asn Gly Tyr Phe Tyr Ser
1 5 10 15

Tyr Trp Asn Asp Gly His Gly Gly Val Thr Tyr Thr Asn Gly Pro Gly
20 25 30

Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly
35 40 45

Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly
50 55 60

Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp Ser
65 70 75 80

Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr
85 90 95

Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Val Thr Ser Asp Gly
100 105 110

Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile
115 120 125

Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His
130 135 140

Arg Ser Ser Gly Ser Val Asn Thr Ala Asn His Phe Asn Ala Trp Ala
145 150 155 160

Gln Gln Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val
165 170 175

Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser
180 185 190

<210> 54

<211> 198

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:TrX-DS1
cassette

<400> 54

gcgccacaaa attaggcgaa gtcacttggtg atggatccgt atatgatatc taccgtaccc 60
aacgcgttaa tcagccatcg atcattggaa ccgccacctt ttatcagtac tggagtgtta 120
gacgtaatca tcggagctcc gggtcggtta atactgcatg ccactttaat gcctggggcac 180
agcaagggtt aaccctag 198

<210> 55

<211> 67

<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:TrX-DS1
cassette aa

<400> 55
Gly Ala Thr Lys Leu Gly Glu Val Thr Cys Asp Gly Ser Val Tyr Asp
1 5 10 15
Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile Ile Gly Thr Ala
20 25 30
Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His Arg Ser Ser Gly
35 40 45
Ser Val Asn Thr Ala Cys His Phe Asn Ala Trp Ala Gln Gln Gly Leu
50 55 60
Thr Leu Gly
65

<210> 56
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:TrX-162H-DS1
cassette aa

<400> 56
Ala Cys His Phe Asn Ala Trp Ala Gln His Gly Leu Thr Leu Gly
1 5 10 15

<210> 57
<211> 198
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:TrX-162H-DS2
cassette

<400> 57
gcgccacaaa attagggcga tgcactagtg atggatccgt atatgatatc taccgtaccc 60
aacgcgttaa tcagccatcg atcattggaa ccgccacctt ttatcagtac tggagtgtta 120
gacgtaatca tcggagctcc gggtcgggta atactgcaaa tcactttaat tgctggggcac 180
agcacggggtt aaccctag 198

<210> 58
<211> 67
<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:TrX-162H-DS2
cassette aa

<400> 58

Gly Ala Thr Lys Leu Gly Glu Cys Thr Ser Asp Ser Ser Val Tyr Asp
1 5 10 15

Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile Ile Gly Thr Ala
20 25 30

Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His Arg Ser Ser Gly
35 40 45

Ser Val Asn Thr Ala Asn His Phe Asn Cys Trp Ala Gln His Gly Leu
50 55 60

Thr Leu Gly
65

<210> 59

<211> 198

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:TrX-162H-DS4
cassette

<400> 59

ggcgcacaaa attagggcga tgcacttggtg atggatccgt atatgatatc taccgtaccc 60
aacgcgttaa tcagccatcg atcattggaa ccgccacctt ttatcagtac tggagtgtta 120
gacgtaataca tcggagctcc gggttcggta atactgcatg ccactttaat tgctggggcac 180
agcacggggtt aaccctag 198

<210> 60

<211> 67

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:TrX-162H-DS4
cassete aa

<400> 60

Gly Ala Thr Lys Leu Gly Glu Cys Thr Cys Asp Gly Ser Val Tyr Asp
1 5 10 15

Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile Ile Gly Thr Ala
20 25 30

Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His Arg Ser Ser Gly
35 40 45

Ser Val Asn Thr Ala Cys His Phe Asn Cys Trp Ala Gln His Gly Leu
50 55 60

Thr Leu Gly
65

<210> 61

<211> 42

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:TrX-162H-DS1
cassette

<400> 61

catgccactt caatgcatgg gcacagcacg gggttaaccct ag

42

<210> 62

<211> 190

<212> PRT

<213> Artificial Sequence

<220>

<223> TrX-162H-DS1

<400> 62

Gln Thr Ile Gln Pro Gly Thr Gly Tyr Asn Asn Gly Tyr Phe Tyr Ser
1 5 10 15

Tyr Trp Asn Asp Gly His Gly Gly Val Thr Tyr Thr Asn Gly Pro Gly
20 25 30

Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly
35 40 45

Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly
50 55 60

Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp Ser
65 70 75 80

Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr
85 90 95

Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Val Thr Cys Asp Gly
100 105 110

Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile
115 120 125

Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His
130 135 140

Arg Ser Ser Gly Ser Val Asn Thr Ala Cys His Phe Asn Ala Trp Ala
145 150 155 160

Gln His Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val
165 170 175

Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser
180 185 190

<210> 63

<211> 190

<212> PRT

<213> Artificial Sequence

<220>

<223> TrX-162H-DS2

<400> 63

Gln Thr Ile Gln Pro Gly Thr Gly Tyr Asn Asn Gly Tyr Phe Tyr Ser
1 5 10 15

Tyr Trp Asn Asp Gly His Gly Gly Val Thr Tyr Thr Asn Gly Pro Gly
20 25 30

Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly
35 40 45

Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly
50 55 60

Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp Ser
65 70 75 80

Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr
85 90 95

Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Cys Thr Ser Asp Gly
100 105 110

Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile
115 120 125

Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His
130 135 140

Arg Ser Ser Gly Ser Val Asn Thr Ala Asn His Phe Asn Cys Trp Ala
145 150 155 160

Gln His Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val
165 170 175

Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser
180 185 190

<210> 64
 <211> 190
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> TrX-162H-DS4

<400> 64
 Gln Thr Ile Gln Pro Gly Thr Gly Tyr Asn Asn Gly Tyr Phe Tyr Ser
 1 5 10 15
 Tyr Trp Asn Asp Gly His Gly Gly Val Thr Tyr Thr Asn Gly Pro Gly
 20 25 30
 Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly
 35 40 45
 Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly
 50 55 60
 Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp Ser
 65 70 75 80
 Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr
 85 90 95
 Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Cys Thr Cys Asp Gly
 100 105 110
 Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile
 115 120 125
 Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His
 130 135 140
 Arg Ser Ser Gly Ser Val Asn Thr Ala Cys His Phe Asn Cys Trp Ala
 145 150 155 160
 Gln His Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val
 165 170 175
 Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser
 180 185 190

<210> 65
 <211> 190
 <212> PRT
 <213> Artificial Sequence

<220>

<223> TrX-DS8

<400> 65

Gln Thr Ile Gln Pro Gly Thr Gly Tyr His Asn Gly Tyr Phe Tyr Ser
1 5 10 15

Tyr Trp Asn Asp Gly His Gly Gly Val Thr Met Thr Leu Gly Pro Gly
20 25 30

Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asp Phe Val Gly Gly
35 40 45

Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly
50 55 60

Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp Ser
65 70 75 80

Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr
85 90 95

Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Val Thr Cys Asp Gly
100 105 110

Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Ala Pro Ser Ile
115 120 125

Glu Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His
130 135 140

Arg Ser Ser Gly Ser Val Asn Thr Ala Cys His Phe Asn Ala Trp Ala
145 150 155 160

Gln His Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val
165 170 175

Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser
180 185 190